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# A SUMMARY OF THE FOOD HABITS OF NORTH AMERICAN COLEOPTERA

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THE Coleoptera or beetles contain a very large number of species and show a great diversity of habits. Most of them are terrestrial and they live under almost all conditions where insect life is possible. The economic status of this group of insects is important. To the Coleoptera belong some of our most pernicious agricultural pests as, for example, the cotton boll weevil, which has caused such ruin in the cotton belt, the Colorado potato beetle with its familiar destructive activities and various other species which attack forests and field crops with varying degrees of intensity. However, many species of Coleoptera are engaged in useful activities and it is the purpose of this paper to summarize briefly, and in a very general way, the food habits of the families in this order.

For the purpose of convenience in handling and for the sake of simplicity, the families have been grouped into a few important classes and the placing of each family was based mainly on the predominating larval activities of its members. In some families considerable variation occurs in the food habits of the different species. For instance, in the *Scarabaeidae*, some are destructive to green vegetation and others thrive on vegetable decay. On the whole, however, their activities are saprophytic and for this reason the entire family was placed in the group Saprophaga. The *Staphylinidae* were placed in this group also, although this family contains members which live in fungi, in animal and vegetable decay, in the nests of ants and some which are predatory. In quite a few of the families, the activities of the species are practically identical.

The classes into which the families are grouped are as follows: Phytophaga, Saprophaga and Harpactophaga. In addition to these three important ones, the species attacking mammals and those whose family habits are

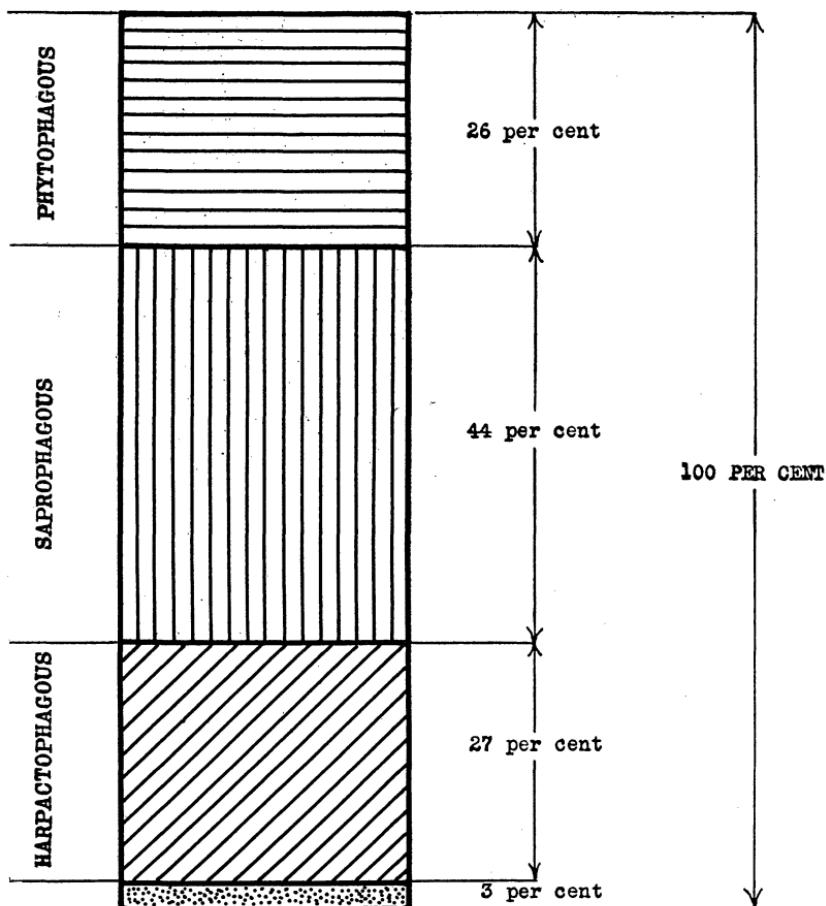


Diagram illustrating the comparative abundance of the various types of food-habits in the Coleoptera.

obscure have been grouped separately. In the Phytophaga have been placed those species which feed upon the higher plants. In the Saprophaga will be found those forms which feed for the most part upon disorganized tissue, vegetable and animal decay and such

species which remove or change the form of animal and vegetable remains and aid in reducing such substances into shape for assimilation by plants. While not strictly belonging to this group, species feeding on low forms of plants such as fungi and those living on dry vegetable and animal matter have been included for the sake of convenience and in order to avoid numerous subdivisions. In other words, the term Saprophaga is used in a very broad sense.

The Harpactophaga contains the predacious and carnivorous species, of which there are a great number, and whose activities help to preserve a natural balance between certain groups. Many of them are general feeders, appearing to be not particular whether their prey is a plant feeder or another predatory form. However, in some families, such as the *Coccinellidae*, there is a decided specialization as to the prey, and such a group is very often an important specific check to unusual increases in the numbers of plant lice. The Coleoptera attacking living mammals are few in number. The species in the family *Platypsyllidae* consists of a wingless beetle found on beavers. In the *Leptinidae*, the species have been found in the nests of field mice and bumble-bees, but their exact habits are somewhat obscure. It has been suggested that the bumble-bee nest is the natural home and that the field mice afford transportation from one nest to another.

The last group is made up of those families of which little or nothing appears to be known concerning their food habits. While this same lack of information is true for a large number of individual species placed in the other groups, yet enough is known of their general family habits so that little risk is run in placing them as family units. This, however, could not be done with any certainty in the case of the last class and they are presented simply as a group difficult to classify from a food standpoint.

The following tables show the name of each family, the number of species in that family described up to and in-

cluding 1918 and a brief statement indicating the more important food habits. The information in the first two columns was compiled from the recently issued "Catalogue of the Coleoptera of America North of Mexico" by C. W. Leng.

#### PHYTOPHAGA

Family	No. Species	Habits
Lymexyliðæ .....	2	Bore in hard wood.
Buprestidæ .....	379	Wood borers in healthy and unhealthy trees.
Cerambycidæ .....	1,123	Borers in dead, dying and healthy trees and plants.
Chrysomelidæ .....	974	Feeders on vegetable tissue.
Mylabridæ .....	93	In seeds.
Brentidæ .....	6	In wood.
Belidæ .....	1	Like Curculionidæ.
Curculionidæ .....	1,839	Feeders upon vegetable tissue.
Platypodidæ .....	5	Boring in trees.
Scolytidæ .....	379	Borers in wood, healthy and sick trees.

#### SAPROPHAGA

Family	No. Species	Habits
Silphidæ .....	137	Seavengers in dead animal and vegetable matter, in fungi.
Clambidæ .....	6	Same as above.
Orthoperidæ .....	57	In decaying vegetation, under bark, etc.
Staphylinidæ .....	2,748	Varied, in ants' nests, in fungi, in decaying animal and vegetable matter, etc., predatory.
Pselaphidæ .....	355	Varied, in ants' nests, under vegetable decay, in wet moss, in rotten stumps, etc.
Clavigeridæ .....	7	Same as above.
Ptiliidae .....	83	In decaying vegetable matter, excrement, fungi.
Sphæriiidæ .....	3	In vegetable decay.
Scaphidiidæ .....	50	In rotten wood, fungi.
Sphærítidæ .....	1	Same as Silphidæ.
Cupesidæ .....	4	Under bark, in dry wood, may be predaceous.
Edemeridæ .....	49	In timber cast up by sea.
Mordellidæ .....	142	Varied, adults on flowers, larvæ in dead wood, fungi, stems of live plants.
Pythidæ .....	17	In timber.
Pyrochroidæ .....	11	Under bark of tree stumps.
Euglenidæ .....	39	In dead wood.
Cerophytidæ .....	2	Probably like those of Elateridæ.
Cebriónidæ .....	9	Probably like those of Elateridæ.
Elateridæ .....	576	In decaying wood, in soil on roots of grasses, etc.

Melasidæ .....	57	In dead trees.
Throscidæ .....	25	Like those of <i>Elateridae</i> .
Dascillidæ .....	29	On roots of aquatics, in fungi.
Dermestidæ .....	129	In dried animal matter.
Ostomidæ .....	64	Varied, under bark, in granaries, in fungi, predaceous.
Nitidulidæ .....	132	Sap beetles, on flowers, predaceous.
Rhizophagidæ .....	14	Probably like above.
Monotomidæ .....	36	In ants' nests, probably have no relations with ants.
Erotylidæ .....	71	Mainly in fungi.
Cryptophagidæ .....	135	In fungi and decomposing vegetable matter.
Mycetophagidæ .....	32	Under bark, in fungi.
Colydiidæ .....	84	In fungus covered wood.
Lathridiidæ .....	104	In fungi.
Mycetætidæ .....	4	In fungi.
Endomychidæ .....	34	In fungi.
Phalacridæ .....	117	Under bark, on flowers.
Alleculidæ .....	124	Larvae in rotten wood, adults on leaves, flowers.
Tenebrionidæ .....	1,139	In dry vegetable matter, fungi.
Lagriidæ .....	17	Probably like above.
Melandryidæ .....	81	In dry wood, fungi.
Ptinidæ .....	37	In dry animal and vegetable matter, wood, drugs, etc.
Anobiidæ .....	233	In dry vegetable matter.
Bostrichidæ .....	61	In dry wood.
Lyctidæ .....	16	In dry wood.
Sphindidæ .....	6	In fungi.
Cisidæ .....	85	In fungi.
Searabæidæ .....	996	Varied, in decaying vegetation, on roots of plants, on green vegetation.
Lucanidæ .....	30	In decaying wood.
Passalidæ .....	2	In decaying wood.
Platystomidæ .....	62	On dead wood, in fungi.

## HARPACTOPHAGA

Family	No. Species	Habits
Cineindelidæ .....	114	Predaceous.
Carabidæ .....	2,165	Predaceous.
Omophronidæ .....	15	Predaceous.
Haliphilidae .....	41	Aquatic, predaceous.
Dytiscidæ .....	333	Aquatic, predaceous.
Gyrinidæ .....	41	Aquatic, predaceous.
Hydrophilidæ .....	190	Predaceous.
Seydmænidæ .....	174	Feeding on acari, in ants' nests.
Histeridæ .....	384	Found in same situations as scavengers but probably predaceous.

Lycidæ .....	50	Carnivorous as larvæ.
Lampyridæ .....	52	Larvæ carnivorous, adults on flowers.
Phengodidæ .....	23	Larvæ carnivorous, adults on flowers.
Cantharidæ .....	155	Larvæ carnivorous, adults on vegetation.
Melyridæ .....	321	Predaceous, adults on flowers.
Cleridæ .....	181	Predaceous, adults on flowers.
Corynetidæ .....	38	Predaceous.
Cephaloïdæ .....	8	Probably similar to those of <i>Cantharidae</i> .
Rhipiphoridæ .....	26	Larvæ parasitic in ants' nests, on cockroaches.
Meloidæ .....	227	Larvæ predaceous, adults on green vegetation.
Cueujidæ .....	85	Varied, under bark, predaceous, in stored products.
Coccinellidæ .....	362	Predaceous.

## ANIMAL PARASITES

Family	No. Species	Habits
Platypyllidæ .....	1	Animal parasite.
Leptinidæ .....	3	Probably parasitic on mammals.

## FOOD HABITS OBSCURE

Family	No. Species	Habits
Amphizoidæ .....	2	Aquatic.
Brathinidæ .....	3	
Telegeusidæ .....	1	
Micromalthidæ .....	1	
Eurystethidæ .....	3	
Pedilidæ .....	54	Probably like those of <i>Anthicidæ</i> .
Anthicidæ .....	191	On surface of earth like ground beetles.
Plastoceridæ .....	19	
Rhipiceridæ .....	6	In wood.
Psephenidæ .....	4	Semi-aquatic.
Dryopidæ .....	17	Aquatic.
Helmidæ .....	36	Aquatic.
Heteroceridæ .....	11	Semi-aquatic.
Georysidæ .....	2	In wet places.
Helodidæ .....	32	Probably aquatic.
Chelonariiidæ .....	1	
Byrrhidæ .....	97	Habits obscure, on ground beneath cover, about grass roots.
Rhysodidæ .....	4	
Derodontidæ .....	5	
Murmidiidæ .....	5	
Monœtidæ .....	1	
Monommidae .....	6	

## SUMMARY

	No. Species	Per Cent. of Total
Phytophaga .....	4,801	26
Saprophaga .....	8,252	44
Harpactophaga .....	4,985	27
Animal parasites .....	4	
Food habits obscure .....	501	3
	<u>18,543</u>	<u>100</u>

About 26 per cent. of the species of Coleoptera are phytophagous, most of this percentage being made up of the families *Curculionidæ*, *Cerambycidæ* and *Chrysomelidæ*. Almost one half of the species of beetles, or 44 per cent., appears to be saprophagous for the most part and in this group the families *Staphylinidæ*, *Tenebrionidæ* and *Scarabæidæ* supply over half of the species. In the predaceous group, consisting of 27 per cent. of the total, the *Carabidæ* with its 2,165 species is the largest single contributor. Thus almost three fourths of the species of beetles in North America are apparently engaged in what we call useful activities.